Rheological Parameters of Some Liquids at Various External Conditions

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Investigations of the dependencies of rheological parameters (viscosity, density) of liquids at various temperatures and pressures are of certain theoretical and practical significance. There is a lack of such investigations at various external pressures.

In this work, we present the results of study of the viscosity and density of the isomers of xylene, chloroform, ethyl acetate, acetonitrile in the range of pressures 0.1 – 150 MPa and temperatures 293-360K.

In all cases, the viscosity and density of the studied liquids increases with rising pressure. There is non-linear decrease of these parameters with rising temperature. Such changes are explained by changing the free volume and intermolecular interaction in the studied liquids.

As a whole, the results obtained are discussed in terms of Frenkel's hole theory, the Bachinsky formula, as well as other theories of the liquid state of matter.